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10/573,810	03/28/2006	Nobuo Miyadera	396.46073X00	9359

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ARLINGTON, VA 22209-3873

EXAMINER
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BEDTELYON, JOHN M

ART UNIT	PAPER NUMBER
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2874

NOTIFICATION DATE	DELIVERY MODE
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09/03/2009

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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<b>Office Action Summary</b>	<b>Application No.</b> 10/573,810	<b>Applicant(s)</b> MIYADERA ET AL.	
	<b>Examiner</b> JOHN M. BEDTELYON	<b>Art Unit</b> 2874	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 21 May 2009.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-21, 24, 25 and 28-40 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-21, 24, 25 and 28-40 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 March 2008 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Response to Amendment***

1. This action is responsive to the amendment and remarks submitted 05/21/2009. Claims 1, 2, 21, and 25 are currently amended. No claims are newly added. Claims 22, 23, 26 and 27 are canceled. Claims 1-21, 24, 25, and 28-40 are currently pending in the application.

### ***Claim Objections***

2. Claim 2 is objected to because of the following informalities: The inclusion of the + symbol in line 9 appears to be a typographical error. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

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consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 1, 4, 7-11, 19-21, 24, 29, 31, 33, 35, 37, and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over the embodiment of figure 11 of Ido (US Patent 6,236,784, hereinafter Ido, embodiment 1) in view of the embodiment of figure 13 of Ido (hereinafter Ido, embodiment 2).

**With respect to claims 1, 4, 7, 21, 24, 33, 35, 37, and 39:** Ido, embodiment 1 teaches: A light branching optical waveguide (see figure 11) comprising:

At least one incident light waveguide (A, a) (I) optically connected to one end of a multi-mode optical waveguide (II), the multi-mode optical waveguide having a geometrical central axis (see figure 11, geometrical central axis is shown but unlabeled), and

Output light waveguides (B) (two waveguides of portion III) connected to the other end of the multi mode waveguide (II);

And an extended line of the geometrical central axis of the at least one optical waveguide (I, shown in figure 11 but not labeled) does not coincide with a geometrical central axis of the multi-mode optical waveguide (figure 11, separated by a distance  $\Delta x$ );

The at least one incident light waveguide (A) comprises one incident light waveguide (I); the output light waveguides (B) comprise two or more output light waveguides (III includes two waveguides, see figure 11);

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Ido, embodiment 1 is silent to the at least one optical waveguide (a) having a curved structure.

Ido, embodiment 2, discloses an optical transmission system including an asymmetric Y branch optical waveguide (301) with an input comprising optical fiber (303) which is shown to have a curved structure.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the asymmetric Y branch waveguide of Ido, embodiment 1, as the asymmetric Y branch (301) of Ido, embodiment 2, as a person with ordinary skill in the art has good reason to pursue the known options within his or her technical grasp. Additionally, column 20, lines 31-36 discloses that that asymmetric Y branch (301) of Ido embodiment 2 is an asymmetric Y branch according to the invention of the present application, which includes and is further motivation to use the asymmetric Y branch waveguide of Ido, embodiment 1 (figure 11). After including the asymmetric Y branch waveguide of Ido, embodiment 1 in Ido embodiment 2, the optical fiber 303 can be interpreted as a portion of the at least one incident light waveguide (A), making up one input optical waveguide when combined with the waveguide portion (I).

The claims further contain the following functional/performance limitations:

wherein light of a basic mode propagating in the at least one incident light waveguide (A) enters on the geometrical central axis of the multi-mode optical waveguide; and An intensity distribution of light entering from at least one optical waveguide (a, A) (I) into the multi-mode optical waveguide (II) at a connected surface of the at least one incident light waveguide (I) and the multi-mode optical waveguide is

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asymmetric with respect to a geometrical central axis of the at least on optical waveguide (I), with light entering from said at least one optical waveguide (a, A, I) into said multi-mode optical waveguide (II), and with light having a wavelength entering at least two of said output light waveguide (III) from said multi-mode optical waveguide, so as to branch said light from the multi-mode optical waveguide having the same wavelength into each of said at least two of said output light waveguides;

characterized in that an optical central axis having a peak intensity in the intensity distribution of light entering into the multi mode optical waveguide from the at least one optical waveguide (a) substantially coincides with the geometrical central axis of the multi mode optical waveguide;

a branching ratio between quantities of light branched into the two or more respective output light waveguides is substantially equal;

wherein said light entering said multi mode optical waveguide from said at least on optical waveguide (a) has said wavelength;

wherein said wavelength is a single wavelength.

The functional limitations of claims 1, 4, 7, 21, 24, 33, 35, 37, and 39 do not further distinguish or structurally limit any of the claimed structures of the claims. The patentability of an apparatus depends only on the claimed structural limitations. Ido teaches a structure that is substantially identical to that of the claimed invention, therefore the device of the Ido combination above is presumed to be capable of the same functions/performances. The burden is on the applicant to show that the Ido

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device does not possess and is not capable of these functional characteristics. See MPEP 2112.01.

**With respect to claim 8**, Ido, embodiment 1 further teaches:

wherein at least one of the incident light waveguide (I) or the output light waveguides (III) comprises a single-mode optical waveguide (column 18, lines 21-23, while this section discusses the method of creating the structure of figure 9a, column 6, lines 49-53 states the methods can be applied to make any of the embodiments discussed).

**With respect to claims 9 and 10**, Ido embodiment 1 further discloses:

wherein at least one of the core or a clad constituting the multi-mode optical waveguide is composed of a polymer partially or entirely and wherein the polymer comprises a polyimide-based resin containing fluorine (column 17, line 62- column 18, line 27).

**With respect to claim 11**, Ido embodiment 1 further discloses:

An optical device comprising the light branching waveguide according to claim 1 (Abstract, lines 4-5).

**With respect to claims 19 and 20**, the combination of Ido embodiments 1 and 2 teach the limitations of claim 1 as previously stated. Ido is silent to the offset between the extended lines of the geometrical central axis of the input waveguide and multi mode waveguide is 1.5 microns or less or .7 microns or less.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to make the offset between the geometrical central axes of the

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input and multi mode waveguides to be less than 1.5 microns or less than .7 microns, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

**With respect to claims 29, 31,** Ido embodiment 1 further discloses: wherein said at least one optical waveguide (a) is directly optically connected to said multi mode optical waveguide (see figure 11).

6. Claims 2, 5, 6, 12-18, 25, 28, 30, 32, 34, 36, 38, 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ido, the embodiment of figures 1, 2, and 5-9 (hereinafter Ido, embodiment 3) in view of Ido, the embodiment of figure 13 (hereinafter Ido, embodiment 2).

**With respect to claims 2, 12, 15, 25, 28, 34, 36, 38, and 40,** Ido, embodiment 3 teaches:

A light branching optical waveguide (see figures 1, 2, and 5-9) comprising:

At least on incident light waveguide (A, a) (I) optically connected to one end of a multi-mode optical waveguide (II); and

Output light waveguides (B) (III) connected to the other end of the multi mode waveguide (II);

A core shape of the multi mode waveguide is asymmetric with respect to a geometrical central axis of the multi mode optical waveguide (see specification and figures 1, 2, and 5-9);

The at least one incident light waveguide (A) comprises one incident light waveguide (I); the output light waveguides (B) comprise two or more output light waveguides (III includes two waveguides, see figures 1, 2, or 5-9);

Ido, embodiment 3 is silent to the at least one optical waveguide (a) having a curved structure.

Ido, embodiment 2, discloses an optical transmission system including an asymmetric Y branch optical waveguide (301) with an input comprising optical fiber (303) which is shown to have a curved structure.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the asymmetric Y branch waveguide of Ido embodiment 3, as the asymmetric Y branch (301) of Ido, embodiment 2, as a person with ordinary skill in the art has good reason to pursue the known options within his or her technical grasp. Additionally, column 20, lines 31-36 discloses that that asymmetric Y branch (301) of Ido embodiment 2 is an asymmetric Y branch according to the invention of the present application, which includes and is further motivation to use the asymmetric Y branch waveguides of Ido, embodiment 3 (figures 1, 2, or 5-9). After including the asymmetric Y branch waveguide of Ido, embodiment 3 in Ido embodiment 2, the optical fiber 303 can be interpreted as a portion of the at least one incident light waveguide (A), making up one input optical waveguide when combined with the waveguide portion (I).

The claims further contain the following functional/performance limitations:

wherein light of a basic mode propagating in the at least one incident light waveguide (A) enters on the geometrical central axis of the multi-mode optical

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waveguide; and An intensity distribution of light entering from at least one optical waveguide (a, A) (I) into the multi-mode optical waveguide (II) at a connected surface of the at least one incident light waveguide (I) and the multi-mode optical waveguide is asymmetric with respect to a geometrical central axis of the at least on optical waveguide (I), with light entering from said at least one optical waveguide (a, A, I) into said multi-mode optical waveguide (II), and with light having a wavelength entering at least two of said output light waveguide (III) from said multi-mode optical waveguide, so as to branch said light from the multi-mode optical waveguide having the same wavelength into each of said at least two of said output light waveguides;

characterized in that an optical central axis having a peak intensity in the intensity distribution of light entering into the multi mode optical waveguide from the at least one optical waveguide (a) substantially coincides with the geometrical central axis of the multi mode optical waveguide;

a branching ratio between quantities of light branched into the two or more respective output light waveguides is substantially equal;

wherein said light entering said multi mode optical waveguide from said at least on optical waveguide (a) has said wavelength;

wherein said wavelength is a single wavelength.

The functional limitations of claims 2, 12, 15, 25, 28, 34, 36, 38, and 40 do not further distinguish or structurally limit any of the claimed structures of the claims. The patentability of an apparatus depends only on the claimed structural limitations. Ido teaches a structure that is substantially identical to that of the claimed invention,

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therefore the device of the Ido combination above is presumed to be capable of the same functions/performances. The burden is on the applicant to show that the Ido device does not possess and is not capable of these functional characteristics. See MPEP 2112.01.

**With respect to claim 5**, Ido embodiment 3 further teaches:

Wherein the core shape of the multi-mode optical waveguide has a notch at at least one of its side edges (see figure 1).

**With respect to claim 6**, Ido embodiment 3 further teaches:

A light branching optical waveguide according to claim 5, wherein: the notch is obtained by cutting out a core of the multi-mode optical waveguide from a side to be connected to the incident light waveguide (I) to a side edge of the core (see figure 1);

and a shape of the notch has a sinusoidal curve ranging from the side to be connected to the incident light waveguide (I) to a side to be connected to the output light waveguides (III) (column 11, lines 51-60, and figure 1).

**With respect to claim 13**, Ido embodiment 3 further teaches:

Wherein the core shape of the multi-mode optical waveguide has a notch at at least one of its side edges (see figure 1).

**With respect to claim 14**, Ido embodiment 3 further teaches:

wherein: the notch is obtained by cutting out a core of the multi-mode optical waveguide from a side to be connected to the incident light waveguide (I) to a side edge of the core (see figure 1);

and a shape of the notch has a sinusoidal curve ranging from the side to be connected to the incident light waveguide (I) to a side to be connected to the output light waveguides (III) (column 11, lines 51-60, and figure 1).

**With respect to claim 16**, Ido embodiment 3 further teaches:

wherein at least one of the incident light waveguide (I) or the output light waveguides (III) comprises a single-mode optical waveguide (column 18, lines 21-23, while this section discusses the method of creating the structure of figure 9a, column 6, lines 49-53 states the methods can be applied to make any of the embodiments discussed).

**With respect to claim 17**, Ido embodiment 3 further teaches:

A light branching optical waveguide according to claim 2, wherein at least one of the core or a clad constituting the multi-mode optical waveguide is composed of a polymer partially or entirely (column 17, lines 63-65, while this section discusses the method of creating the structure of figure 9a, column 6, lines 49-53 states the methods can be applied to make any of the embodiments discussed).

**With respect to claim 18**, Ido embodiment 3 further teaches:

An optical device comprising the light branching waveguide according to claim 2 (Abstract, lines 4-5).

**With respect to claims 30, 32**, Ido embodiment 3 further discloses wherein said at least one optical waveguide (a) is directly optically connected to said multi mode optical waveguide (see figures 1, 2, or 5-9).

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7. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ido, the embodiment of figures 1, 2, and 5-9 (hereinafter Ido, embodiment 3) in view of Ido, the embodiment of figure 13 (hereinafter Ido, embodiment 2) as applied to claim 2 above, and further in view of Ido, the embodiment of figure 11 (hereinafter Ido, embodiment 1).

With respect to claim 3, the combination of Ido, embodiments 3 and 2, disclose the limitations of claim 2 as previously stated. Ido, the embodiment of 3 and 2, are silent to an extended line of the geometrical central axis of the at least one optical waveguide (a) does not coincide with the geometrical central axis of the multi mode optical waveguide. Ido, embodiment 1 discloses an extended line of the geometrical central axis of the at least one optical waveguide (a) does not coincide with the geometrical central axis of the multi mode optical waveguide (see figure 11) and this offset changes the intensity distribution between the output waveguides (column 8, line 10- column 9, line 22).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to offset the input waveguide from the geometrical central axis of the multi mode waveguide in the device of the combination of Ido embodiments 2 and 3, as disclosed by Ido, embodiment 1, because this offset can additionally shape the intensity distribution of light in the output waveguides, thereby increasing functionality and intensity distribution adjusting capabilities of the output waveguides.

### ***Response to Arguments***

8. Applicant's arguments with respect to claims 1-21, 24, 25, and 28-40 have been considered but are moot in view of the new ground(s) of rejection.

***Conclusion***

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JOHN M. BEDTELYON whose telephone number is (571)270-1290. The examiner can normally be reached on Monday - Friday, 10:00am - 6:30pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Uyen-Chau Le can be reached on 571-272-2397. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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